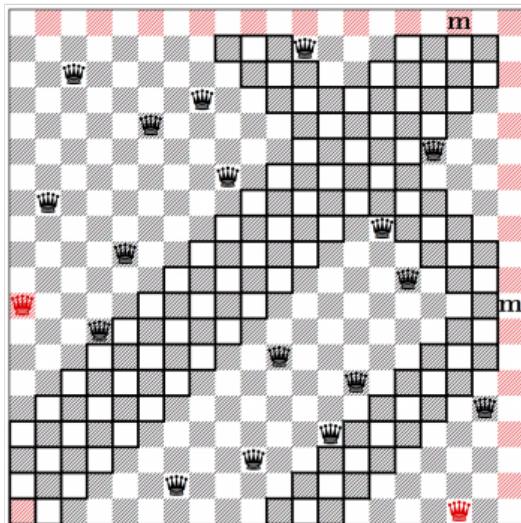




The 8-Queens Puzzle



A recent paper on the complexity of the n -Queens Completion Problem by researchers at the University of St Andrews may point the way to a new attack on one of the Millennium Prize Problems, the P vs NP problem. The paper is an exciting contribution to complexity theory, but it does not say that finding a correct solution to the 8-Queens puzzle or even to the n -Queens puzzle for all n would justify the award of the Millennium Prize.

As Ian Gent, one of the authors, comments: "The 8-Queens puzzle on the chessboard is a classic puzzle, and all solutions to it have long been known. It is also known that the more general n -Queens puzzle can be solved on all larger size chessboards: that is the puzzle of placing n queens on an n -by- n chessboard so that no queen is attacking another. The new research concerns the n -Queens Completion Problem, where not only is the board larger, but also some queens have already been placed. That is, if some queens have already been placed on the n -by- n board, can you find a solution to the n -Queens puzzle without moving any of those queens? The technical contribution claimed in this paper is that the n -Queens Completion Problem falls into the class known as *NP-Complete*. If correct, this means that any algorithm that can solve the n -Queens Completion Problem can be

used indirectly to solve any other problem in the NP class. This does not apply to the original n -Queens puzzle, because the addition of pre-placed queens is critical.

"Unfortunately, some reports of our work have given the impression that solving the 8-queens puzzle, or the n -queens puzzle for all n , might result in the award of the Millennium Prize. This is not the case, for two reasons. First, as just mentioned, the paper is about the n -Queens Completion problem, not the original n -Queens puzzle. Second, even the discovery of an algorithmic solution to the n -Queens Completion puzzle for all n would not be enough. What would be necessary would be either a proof that there is an algorithm that can solve the n -Queens Completion puzzle in polynomial time, or a proof that no such algorithm exists."

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